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REMARKS

The pending claims are 1, 3, 4, 9-11. Claims 1, 3, 4 and 9 have been amended. Claim 11 has been added. No new matter is introduced therein.

Claim 3 has been rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to convey that the inventors possessed the claimed invention at the time the application was filed. Specifically, claim 3 was rejected for two reasons. First, in the opinion of the U.S. Patent and Trademark Office, the lower limit of 0.075 % has not been defined in the specification as the lower limit for all possible additives. Second, in the opinion of the Office, the term "about" before both ranges is not supported by the specification. Claim 3 has now been amended by deleting reference to 0.075 % and by deleting "about." Basis for this amendment may be found in the specification at page 3, line 26 through page 5, line 10. Accordingly, applicants request that the § 112, first paragraph rejection be withdrawn.

Claims 1, 3 and 9 have been rejected under 35 U.S.C. § 102(b) as being anticipated by, or, in the alternative, under 35 U.S.C. § 103(a) as being obvious over either Duncan (U.S. Patent No. 3,296,004) or Janakirama-Rao (U.S. Patent No. 3,779,733). The Office Action contends that claims 1 and 9 are anticipated because the references teach soda-lime glass batches with an additive which is within the scope of the additives in claims 1 and 9. Alternatively, the Office Action contends that there is no distinction between the references and the claimed invention "in the absence of any evidence showing the contrary."

Claim 1 has now been amended in two ways. Claim 1 has been amended by deleting recitations pertaining to an oxide of cobalt; a chloride of tin and cobalt; a sulfate of tin and cobalt; and a nitrate of tin and cobalt. Claim 9 has been amended by deleting recitations pertaining to tin oxide and cobalt oxide. As a result, these claims are now distinguished from the cited references because neither of the cited references have an additive which is within the scope of the claimed additives. With respect to claim 1, neither reference discloses the

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following additives: an oxide of lead (Pb), or Lithium (Li); a chloride of iron (Fe), Pb, or Li; a sulfate of Fe, Pb, or Li; and a nitrate of Fe, Pb, or Li.

Claims 1 and 9 have also been amended by adding the recitation: "wherein the additive suppresses formation of nickel sulfide in a resulting soda-lime glass." This recitation is supported by page 1, lines 5-10; page 3, lines 15-18; page 4, lines 6-10; page 8, lines 21-23; page 10, lines 7-9; page 11, line 30-page 12, line 3 of the specification. Neither of the references nor their combination discloses or suggests this claim element.

Accordingly, claims 1 and 9 are not subject to rejection under 35 U.S.C. § 102(b) as being anticipated by, or, in the alternative, under 35 U.S.C. § 103(a) as being obvious over either Duncan or Janakirama-Rao.

The Office Action stated that claim 3 has not been considered for rejection purposes because it contained new matter. Nevertheless, applicants contend that the amendment to claim 3 precludes it from being rejected based upon the cited prior art because it is based upon claim 1 and the rejection of claim 1 should be withdrawn.

Claims 4 and 10 have been rejected under 35 U.S.C. § 102(a) as being obvious over Amrhein et al. (U.S. Patent No. 4,270,945). The rejection is respectfully traversed. There are substantial and significant differences between the invention recited in amended claim 4 and the device disclosed by Amrhein.

First, amended claim 4 recites that it adds LiNO₃ "to suppress formation of nickel sulfide." This recitation is supported by page 4, lines 6-10, 13-17; page 9, lines 12-17; page 10, lines 1-9 of the specification. That is, a purpose of applicants' device is to prevent formation of a sulfur compound, nickel sulfide. In contrast, the purpose of the device in Amrhein is the opposite. The purpose of the device in Amrhein is to encourage the creation and retention of a sulfur compound (SO₃) in the glass product. The device in Amrhein assists the retention of SO₃ to reduce sulfur-containing emissions (col. 1, lines 7-9), not by suppressing the actual formation of sulfur-containing compounds. The Office

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Action acknowledges that the purpose of the Amrhein device is to "suppress[] sulfurous emissions." Applicants' interpretation of Amrhein is supported by the following in that patent:

[I]ncluding an oxidizing agent in the batch being fed to a glass melting furnace suppresses wasteful, premature volatilization of sulfur-containing melting and fining aids in the early stages of melting. More of the sulfur is incorporated into the melt . . . where it functions usefully. . . .(col. 3, line 68-col. 4, line 5)

Melts 9 and 10 show substantial increases in SO₃ retention. (col. 6, lines 11-12).

Table IV shows a more dramatic improvement in sulfur retention in the nitrate containing melts 8, 9, and 10. (col. 6, lines 55-57).

The net effect is that with nitrate being added less sulfur escapes as an emission. (col. 8, lines 18-19)

Thus, an additive that prevents formation of a sulfur compound would defeat the purpose of Amrhein. A claim element can not be obvious in view of a reference if the claim element would defeat the purpose of the reference.

Second, amended claim 4 recites that "about 50% of the amount of mirabilite (Na₂SO₄) contained in the glass raw material is replaced by the LiNO₃." The Office Action contends that the replacement of the Na₂SO₄ with nitrate is broadly stated in Amrhein, that "no specific percentages are defined," and that such a broad, undefined replacement rate automatically means that any replacement rate would be obvious. Applicants respectfully disagree. To the contrary, Amrhein does discuss specific replacement rates. Specifically, Amrhein states:

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The amount of oxidizing agent required will vary, depending upon the specific process parameters of a particular furnace a perceivable effect generally being obtainable with about 0.1 percent by weight of the dry batch constituting nitrate salt. No operational upper limit has been ascertained, but above about 3 percent by weight nitrate in the batch the additional improvement is generally insufficient to justify the added cost. (col. 4, lines 23-30)

[T]he benefits at about 0.1 percent nitrate in the batch may be predicted to be rather minimal, but viable nevertheless. The upper limit appears to be one of economics, with predictably diminishing returns for additional nitrate beyond about 3 percent of the batch. (col. 8, lines 26-31)

Since Amrhein teaches a maximum of only a 3% nitrate addition and since Amrhein expressly states that increases above 3% result in "predictably diminishing returns," it would not be obvious to one of ordinary skill in the art to increase dramatically the amount of nitrate addition up to 50% of the mirabilite.

The Office Action also contends that since Amrhein teaches the use of an inorganic, alkali nitrate, it would have been obvious to use any alkali nitrate in Amrhein. Since amended claim 4 recites lithium nitrate (LiNO_3), the Office Action presumably contends that it would be obvious to use lithium nitrate (LiNO_3) in Amrhein. Applicants disagree. Amrhein states:

The oxidizing agents employed in the invention are inorganic nitrate salts, particularly sodium nitrate, calcium nitrate, and magnesium nitrate. . .Potassium nitrate is another suitable oxidizing agent. . .The preferred oxidizing agent is sodium nitrate due to its commercial availability and the ease with which sodium can be incorporated into a flat glass batch formula. (col. 4, lines 12-22)

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See also, col. 5, lines 67-68 (stating that the preferred oxidizing agent is sodium nitrate). Although col. 8, line 46 refers to "the alternative nitrates," it must be construed as referring to the alternative nitrates quoted above in col. 4, lines 12-22. There is no basis in Amrhein to conclude that it is referring to any and all possible nitrates. Therefore, it would not be obvious to use lithium nitrate (LiNO_3) in the Amrhein device.

For all of the above reasons, Applicants request that the rejection of claim 4 be withdrawn. Since claim 10 is dependent upon claims 1 and 4, Applicants request that the rejection of claim 10 also be withdrawn.

Claims 4 and 10 have also been rejected under 35 U.S.C. § 103(a) as being unpatentable over either Duncan in view of Amrhein et al. or Janakirama-Rao in view of Amrhein et al. The rejections are respectfully traversed. The Office Action contends that "it would have been obvious to replace a portion of the Na_2SO_4 in the batches according to Duncan and Janakirama-Rao because Amrhein et al. teaches that it is well known to replace a portion of the Na_2SO_4 in soda lime glass batches with a nitrate in order to suppress sulfurous emissions." Applicants respectfully disagree.

The purposes of Amrhein and Duncan are completely different. As noted above, the purpose of Amrhein is to suppress sulfurous emissions. The purpose of Duncan is the production of a glass that is free "from color problems in daylight" and "having a high order of solar heat absorption with a pleasing neutral brown color." (col. 7, lines 19-26). There is no suggestion in Duncan that an adjustment should, or can, be made to the amount of sodium nitrate in order to suppress sulfurous emissions. There is also no suggestion in Duncan that lithium nitrate (recited in claim 4) could be substituted for the sodium nitrate in Duncan. Furthermore, the Office Action does not explain how the skilled person would know that the method in Duncan would perform its stated function if the 30 pounds of sodium nitrate identified in Examples I and II were substituted with 50% lithium nitrate.

Similarly, the purposes of Amrhein and Rao are completely different. The purpose of Rao is to create a glass that has high visible light

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transmission (col. 1, lines 13-14, 57) and can absorb a high percentage of incoming infrared radiation. (col. 1, lines 14-15, 49-51). Rao refers to sodium nitrate as a refining agent (col. 3, lines 17-18) and discloses that it uses iron and tin to "counteract the oxidizing influences of the refining agents" such as sodium nitrate. There is no suggestion in Rao that an adjustment should, or can, be made to the amount of sodium nitrate in order to suppress sulfurous emissions. There is also no suggestion in Rao that lithium nitrate (recited in claim 4) could be substituted for the sodium nitrate in Rao. Furthermore, the Office Action does not explain whether the device in Rao would perform its stated function if 50% lithium nitrate were substituted for the sodium nitrate in Rao. The problem of operability is particularly evident because Rao expressly discloses that it is already using iron and tin to counteract the refining agents, including sodium nitrate. The Office Action does not explain how by substituting 50% lithium nitrate for the sodium nitrate Rao's method would still be operable.

Finally, none of the cited references discloses or suggests the limitation, "wherein the additive suppresses formation of nickel sulfide in a resulting soda-lime glass," as required by amended claims 4 and 10.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicants' disclosure.¹

Here, the Examiner has relied upon hindsight to arrive at the determination of obviousness. It is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious. The court has stated that

¹ MPEP § 706.02(j)

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"[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention." *In re Fritch*, 23 USPQ 2d 1780, 1783, 1784 (Fed. Cir. 1992)

The rejection here runs afoul of a basis mandate inherent in § 103 – that “a piecemeal reconstruction of the prior art patents in light of [applicants’ disclosure] shall not be the basis for a holding of obviousness. “It is impermissible within the framework of section 103 to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art.” *In re Kamm and Young*, 172 USPQ 298, 301-302 (CCPA 1972).

For the above reasons, claim 4 is not subject to rejection under 35 U.S.C. § 103(a) over either Duncan in view of Amrhein et al. or Janakirama-Rao in view of Amrhein et al. Since claim 10 is dependent upon claim 4, it, too, is not subject to rejection under 35 U.S.C. § 103(a) over either Duncan in view of Amrhein et al. or Janakirama-Rao in view of Amrhein et al.

Newly added claim 11 is a modified version of claim 3 before it was amended in accordance with the contentions of the Office Action. That is, the Office Action states that the specification does support the lower limit of 0.075% for the additive iron nitrate hydrate. In view of the Office Action’s statement, claim 11 recites that “the additive is a nitrate of Fe” and “the percentage by weight of the additive is from 0.075% to 0.15% on the basis of the total weight of the glass raw material.” Neither reference discloses an additive being a nitrate of Fe where “the percentage by weight of the additive is from 0.075% to 0.15% on the basis of the total weight of the glass raw material.” In addition, claim 11 recites the additive is “added to suppress formation of nickel sulfide in a resulting soda-lime glass.” Neither of the references teaches the addition of such an additive for the recited purpose. Basis for this amendment may be found in Table 5 of the subject specification. Accordingly, applicants contend that there is no basis to reject claim 11 based upon the cited prior art.

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The prior art made of record and not relied upon is not considered any more pertinent to applicants' disclosure than that already cited.

In view of the foregoing amendments and remarks, Applicants request that the Examiner reconsider and withdraw the rejection of claims 1, 3, 4, 9-11.

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VERSION WITH MARKINGS TO SHOW CHANGES MADECLAIMS:

1 1. (Twice Amended) A raw material composition for soda-lime glass,
2 comprising a mirabilite (Na_2SO_4)-containing glass raw material having the
3 incorporation of an additive selected from the group consisting of an oxide of tin
4 (Sn), cobalt (Co), lead (Pb), or lithium (Li), a chloride of Sn , iron (Fe), Co , Pb
5 or Li , a sulfate of Sn , Fe , Co , Pb , or Li , and a nitrate of Sn , Fe , Co , Pb , or Li ,
6 wherein the additive suppresses formation of nickel sulfide in a resulting soda-
7 lime glass.

1 3. (Twice Amended) A raw material composition for soda-lime glass
2 according to claim 1, wherein the percentage by weight of the additive is ~~from~~
3 ~~about 0.075% to about 0.15%~~ on the basis of the total weight of the glass raw
4 material.

1 4. (Twice Amended) A raw material composition for soda-lime glass,
2 comprising a mirabilite (Na_2SO_4)-containing glass raw material having the
3 incorporation of lithium nitrate ($LiNO_3$), wherein about 50% of the amount of
4 mirabilite (Na_2SO_4) contained in the glass raw material is replaced by the $LiNO_3$,
5 wherein the $LiNO_3$ suppresses formation of nickel sulfide in a resulting soda-
6 lime glass.

1 9. (Amended) A raw material composition for soda-lime glass,
2 comprising a mirabilite (Na_2SO_4)-containing glass raw material having the
3 incorporation of an additive selected from the group consisting of tin (SnO_2),
4 cobalt oxide (CoO), lead oxide (PbO), lithium nitrate ($LiNO_3$), $Fe(NO_3)_3 \bullet 9 H_2O$, $FeCl_3 \bullet 6 H_2O$, and $FeSO_4 \bullet 7 H_2O$, wherein the additive suppresses
5 formation of nickel sulfide in a resulting soda-lime glass.

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1 11. (Newly Added) A raw material composition for soda-lime glass
2 according to claim 1, wherein the additive is a nitrate of Fe, the percentage by
3 weight of the additive is from 0.075% to 0.15% on the basis of the total weight
4 of the glass raw material, wherein the additive suppresses formation of nickel
5 sulfide in a resulting soda-lime glass.